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## PERENNIAL MYCELIUM OF THE FUNGUS OF BLACKBERRY RUST.\*

Plates V, VI.

By F. C. NEWCOMBE.

In May of the present year, at the suggestion of Mr. Galloway, a plant of *Rubus villosus* affected with *Cæoma nitens*, Schw. was examined with a view to ascertaining whether there is a perennial mycelium.

A shoot of the blackberry was selected whose lowest leaf bearing the rust was 16 centimeters from the rooting portion of the stem. Beginning with the leaf, cross and longitudinal sections were made, at intervals of 2 centimeters, down to the roots.

At every place of section the characteristic mycelium was found. In one instance the mycelium was observed in the medullary rays; in every other case in the pith only. It is septate, intercellular, and coarsely granular. It looks active and vigorous in the old stem as well as in the green shoot. But the most striking part of it is the haustoria. These are found of the same appearance in leaf, green shoot, and old stem. Penetrating the cell wall by a narrow neck, in the cell-lumen a haustorium expands to a large, lobed and knotted, club-shaped body whose diameter exceeds that of the mycelial filament and whose length frequently attains the transverse diameter of the host cell. In longitudinal sections the mycelium can be followed for long distances in the direction of the shoot axis, not often branching laterally, but sending its great haustoria in all directions into the adjacent cells of the host. Not infrequently the mycelium is seen to form a pseudoparenchyma in the intercellular spaces.

These observations were repeated on fresh material gathered near Ann Arbor the latter part of June.

NOTE BY B. T. GALLOWAY.

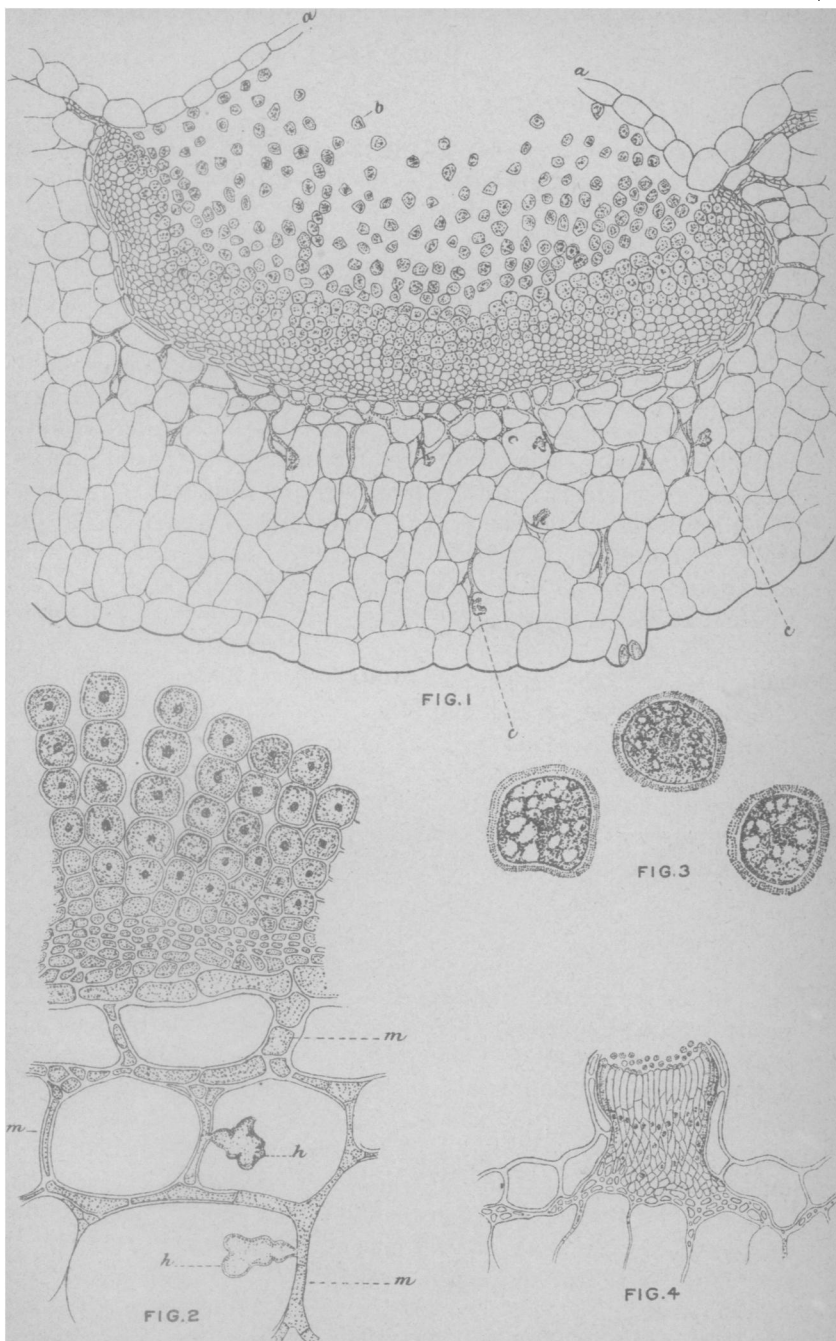
Mr. Newcombe's observations have an important bearing on the treatment of blackberry rust, as they indicate that no direct benefit would result from the application of fungicides. Some writers† have claimed that the fungus does not live over winter in the root and stems, and if this were true it would seem possible to prevent the disease by the timely application of fungicides. Field experiments have shown that such applications, no matter how carefully made, have little effect so far as diminishing the amount of rust is concerned.

It is obvious that the immense number of spores, which form the reddish powder so familiar to every one, plays an important part in the life history of the fungus, and by destroying these spores, spraying may, indirectly, result beneficially. It is doubtful, however, if spraying with this object only in view will pay in the end. After all, it seems that

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\* *Cæoma nitens*, Schw.

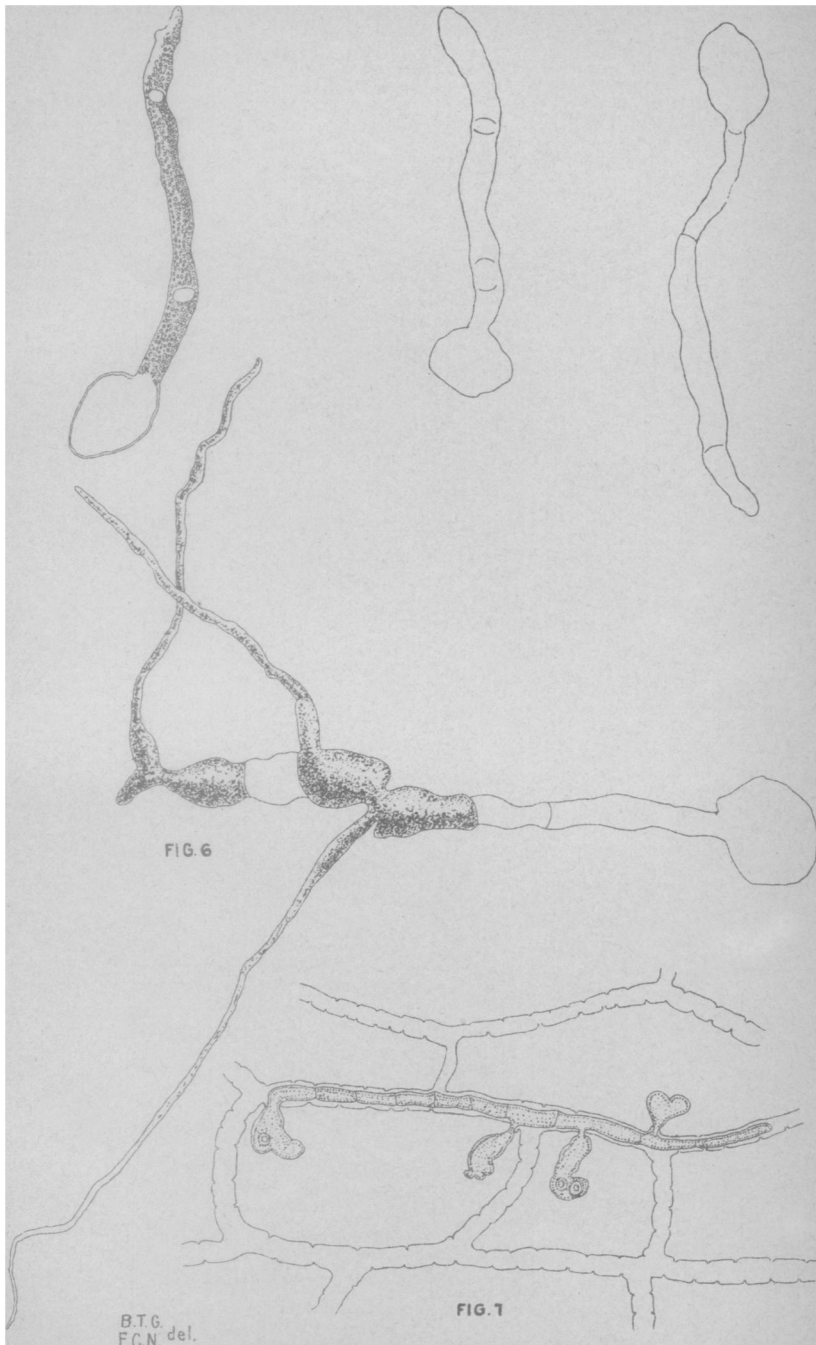
† Burri l, Prairie Farmer. 1885, p. 762. Seymour, Rept. State Hort. Soc. Minn. 1886, p. 214.



E.C.N. del.

NEWCOMB ON BLACKBERRY RUST.

*Caoma nitens*. Schw.



NEWCOMB AND GALLOWAY ON BLACKBERRY RUST.  
*Caoma nitens*. Schw.

the only practical and efficient method of dealing with this pest is the old one of grubbing out the affected plants as soon as they are noticed. It would be well, also, to discard those varieties known to be subject to the trouble.

#### EXPLANATION OF PLATE.

##### BLACKBERRY RUST (*Cecoma nitens*, Schw.).

- Fig. 1. Section through portion of leaf affected with rust; *a a*, ruptured epidermis showing below at *b* the mass of spores; *c c*, haustoria. By means of these the fungus draws its nourishment from the cells. X 100. Newcombe.  
 Fig. 2. Part of section more highly magnified; *m m m*, mycelium surrounding cells of the host; *h h*, haustoria projecting within the cells. X 300. Newcombe.  
 Fig. 3. Spores. X 600. Newcombe.  
 Fig. 4. Section through spermogonium. X 300. Newcombe.  
 Fig. 5. Spores germinating; 24 hours in water. X 250. Galloway.  
 Fig. 6. Spore germinating; 60 hours in water. X 300. Galloway.  
 Fig. 7. Section through piece of old underground stem, showing perennial mycelium and haustoria. X 300. Newcombe.

#### FIELD NOTES—1890.

By ERWIN F. SMITH.

The field naturalist often discovers interesting phenomena not immediately related to his own work—phenomena too fragmentary to be worked up separately, and yet sometimes of much value to others if accurately observed and duly recorded. Such must be my apology for the greater part of the following “notes by the way.”

##### PEACH LEAF CURL.\*

Heretofore, in this country, California orchards are the only ones that have been seriously affected by this widely distributed fungus. This spring, however, it caused great injury in certain districts east of the Mississippi River, and was more than usually prevalent in all the principal peach regions of the eastern United States. It was most destructive in central Michigan and western New York, defoliating trees by the thousand in both localities. By the last of June the fungus had nearly disappeared, and the trees had partially recovered and were clothed with a second crop of leaves. But even in July the effects were plainly visible in enfeebled growths, yellowish foliage, and stunted fruits. Certain varieties suffered much worse than others, *e. g.*, Crawford's Early. It seemed to me it would take some of the trees several years to recover.

In Delaware and peninsular Maryland the fungus was unusually common, but the orchards were not defoliated nor badly attacked. I also observed traces of the disease in Georgia in midsummer, but it did not appear to have attracted attention or caused serious injury.

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\* *Taphrina deformans*, Tul.